PUMA 600 / 700 / 800 XL / LY / XLY

Heavy Duty Turning Center

Doosan Machine Tools

Optimal Solutions for the Future

Heavy Duty Turning Center

PUMA 600 XL / LY / XLY
PUMA 700 XL / LY / XLY
PUMA 800 XL / LY / XLY

Just single setup is enough for large and complex parts

The Puma 600 / 700 / 800 XL / LY / XLY has a 5 meter workpiece length and Y axis capability, giving Doosan a unique place in the market.
First, one setup completes extra long and large workpieces which require both turning and heavy duty milling.
Second, extra rigid construction provides heavy duty machining.
Third, high precision milling applications are possible using improved C axis performance and orthogonal Y axis capability.

One Set-Up Performance

- The largest work envelope in it's class.

Rigid Structure

- 20% increased bed guideway span compared with current model.
- Integral hand-scraped box guideway construction on all slides.

High Precision

- Addition of high resolution rotary scale for high precision C-axis control.
- X-Y interpolation - Easy and Fast milling operation.

High Efficiency

PUMA 600 / 700 / 800 XL / LY / XLY are designed to maximise your productivity and increase profit.

Model	Investment	Design	Manpower	Operation	Tools
Turning Center 1 machine + Machining Center 1 machine	$ $			2 step	
PUMA 700 XLY 1 machine	$			1 step	

Large Size Workpiece

One setup can complete extra long and large complex parts requiring a variety of turning and milling operations.

Unit : mm (inch)

Model	A* Bar working	B Max. work length	Max. turning dia.	Y-axis
PUMA 600XL / XLM PUMA 600XLY	ø 117 (4.6)	5050 (198.8)	900 (35.4) 750 (29.5)	200 (±100) (7.9 (±3.9))
PUMA 700XL / XLM PUMA 700XLY	ø 164 (6.5)	5050 (198.8)	900 (35.4) 750 (29.5)	200 (±100) (7.9 (±3.9))
PUMA 800XL / XLM PUMA 800XLY	ø 318** (12.5**)	5050 (198.8)	900 (35.4) 750 (29.5)	200 (±100) (7.9 (±3.9))

* : Workpiece diameter through drawtube.
** : Maximum bar working in view of spindle bore without draw tube.

• PUMA 700XLY

Unit : mm (inch)

Model	A* Bar working	B Max. work length	Max. turning dia.	Y-axis
PUMA 600L / LM PUMA 600LY	ø 117 (4.6)	3200 (126.0) 3250 (128.0)	900 (35.4) 750 (29.5)	200 (±100) (7.9 (±3.9))
PUMA 700L / LM PUMA 700LY	ø 164 (6.5)	3200 (126.0) 3250 (128.0)	900 (35.4) 750 (29.5)	200 (±100) (7.9 (±3.9))
PUMA 800L / LM PUMA 800LY	ø 318** (12.5**)	3200 (126.0) 3250 (128.0)	900 (35.4) 750 (29.5)	200 (±100) (7.9 (±3.9))

* : Workpiece diameter through drawtube.
** : Maximum bar working in view of spindle bore without draw tube.

• PUMA 700LM

High Efficiency

Doosan Infracore precision machine tools are internationally known for their durability, rigidity and high accuracy. Only well proven and time tested manufacturing techniques can produce machines of this quality.

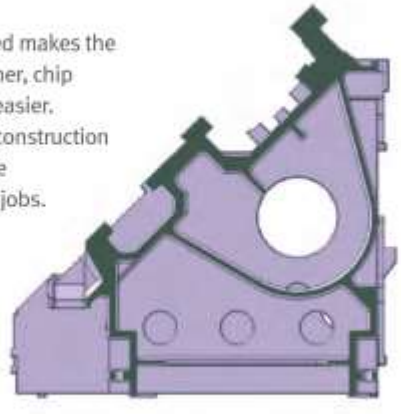
The PUMA 600 / 700 / 800 XL / LY / XLY is a true 45 degree slant bed design. The bed is a one piece casting with both the saddle and tailstock guideways in the same plane to eliminate thermal distortion. The heavily ribbed torque tube design prevents twisting and deformation. Fine grain Meehanite processed cast iron is used because of its excellent damping characteristics. This ensures high rigidity with no deformation during heavy cutting. The slant angle allows for easy loading, changing and inspection of tools. All guideways are wide wrap-around rectangular type for un-surpassed long-term rigidity and accuracy. The guideways are widely spaced to ensure stability and fully protected. Each guide-way is induction hardened and precision ground. A fluroplastic resin, Rulon® 142, is bonded to the mating way surfaces, for its wear and friction characteristics and then hand scraped for a perfect fit and center height. Optional long bed enables extra-long shaft machining. Guide way span and Rib combination was redesigned to get better static and dynamic stiffness. Guide way span is 20 % larger than the current machine.

Rapid Traverse

Scraping of Slideway

Outstanding rigidity for high feedrates

Slant-design bed makes the work go smoother, chip removal much easier. Tough tubular construction stands up to the hardest cutting jobs.



Main Spindle

Main Spindle Drive

The 45kW (60.3Hp) spindle motor provides power for heavy stock removal, greatly reducing the number of roughing passes required. The reliable digital AC spindle motor provides fast acceleration and is maintenance free. The preloaded spindle bearings are specifically calibrated to maintain the perfect balance of rigidity and speed. The geared headstock ensures optimal power throughout a wide speed range.

Max. spindle speed

1800 r/min
[PUMA 600 XL / XLM / LY / XLY]

1500 r/min
[PUMA 700 XL / XLM / LY / XLY]

750 r/min
[PUMA 800 XL / XLM / LY / XLY]

Motor (30 min)

45 kW (60.3 Hp)

Headstock and Spindle Construction

The headstock casting is made of Meehanite and ribbed on the outside to increase the surface area for better heat dissipation. The headstock and main spindle are manufactured in a temperature controlled environment then assembled and tested in our clean room. The heavy duty cartridge type spindle is supported by a double row of cylindrical roller bearings in the front and rear, with duplex angular thrust bearings in between. The cylindrical roller bearings feature a large contact surface which ensures the highest rigidity for heavy loads and superior surface finishes. All spindle bearings are permanently grease lubricated precision class P4.

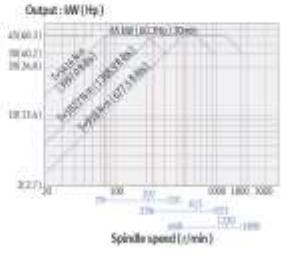
Geared Head

Power is delivered to the spindle through a three (PUMA 600 / 700 XL / XLM / LY / XLY) or two (PUMA 800 XL / XLM / LY / XLY) speed geared head allowing stable spindle speeds change as well as powerful torque.

Main spindle power-torque diagram

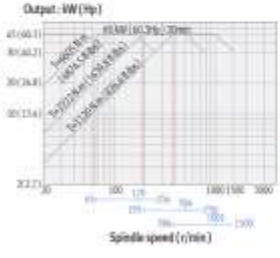
PUMA 600
XL / XLM / LY / XLY

Max. spindle speed
1800 r/min



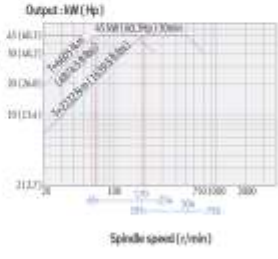
PUMA 700
XL / XLM / LY / XLY

Max. spindle speed
1500 r/min



PUMA 800
XL / XLM / LY / XLY

Max. spindle speed
750 r/min



Turret

PUMA 600 / 700 / 800 XL / LY / XLY

Heavy Duty Turret

The large 12 station heavy duty turret features a large Curvic coupling diameter. This heavy duty design provides unsurpassed rigidity for heavy stock removal, fine surface finishes.

Index time (1-station swivel)
0.25 s

No. of tool station
12 ea

• PUMA 600 / 700 / 800 XLM

• PUMA 600 / 700 / 800 LY / XLY

PUMA 600 / 700 / 800 XL series

Tool Holder DI holder base

PUMA 600 / 700 / 800 XLM / LY / XLY series

Tool Holder BMT 85P Max. Speed **3000** r/min Motor **11 / 7.5** r/min (14.8 / 10.1 Hp)

Preci-Flex Ready Rotary Tools

Preci-Flex ready rotary tool holders are available on the milling versions. Preci-Flex is a tooling system utilizes the existing ER collet taper in the rotary holders. The spindle face is precision ground relative to the taper and there are four drilled and tapped holders in this face. The Preci-Flex adapters locate on both the taper and the spindle face for maximum rigidity.

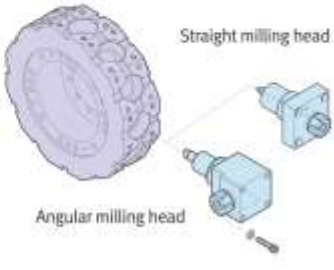
Collet application

Preci-flex adapter application

Radial BMT Turret

The turret for rotary tool head features BMT style tooling in which the tool holders are mounted directly to the turret's periphery using 4 large bolts.

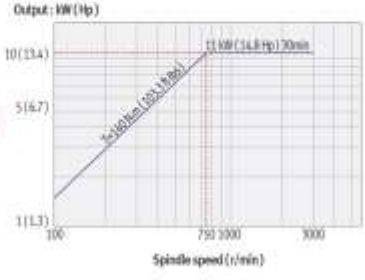
This type of mounting system allows an extremely high degree of rigidity



Rotary tool spindle power-torque diagram

PUMA 600 / 700 / 800 XL / XLM / LY / XLY

Spindle motor
11 kW (14.8Hp) / 30 min



• PUMA 600 / 700 / 800 XL

Y-Axis Capability

To get Y-axis movement, additional column way is used to move rotary tool across the face of the spindle.

The Y-axis way is placed under the carriage / cross slide, on which the turret is mounted . In the Y-axis plane, tools can move in a plus or minus direction perpendicular to the Z-axis and spindle center line. Viewed from the operator's perspective, this Y-axis motion is toward or away from the door of the machine while X-axis motion is floor to ceiling.

X-axis

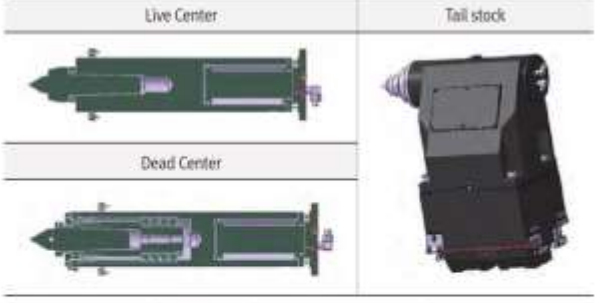
400 mm (15.7 inch)

Y-axis

200 (± 100) mm (7.9 inch)

Programmable Tailstock std.

In order to increase its rigidity, Tail stock was engineered more simply than current model. Quill travel is 200 mm (7.9 inch).



	Unit	Previous	PUMA 700XLY
Quill Thrust	kN	32	42
Quill diameter	mm (inch)	160 (6.3)	160 (6.3)
Quill bore taper	-	MT#6	MT#6
Quill travel	mm (inch)	160 (6.3)	200 (7.9)

Axis Drive Construction

Axis Drives

Each axis is powered by a maintenance free digital AC servo motor. These high torque drive motors are connected to the ball screws without intermediate gears for quiet and responsive slide movement with virtually no backlash.

Accuracy

C-axis index Precision

C축 index

Rotary Scale	Positioning	Repeatability
PUMA 700XLY	9"	5"
PUMA 700XLM	8"	4"

Cutting Hole PCD **ø 350** mm (13.8 inch)

Position **0.036** mm (0.00141 inch)

Cutting Condition

Speed	1200 r/min
Feed	25 mm/min
Depth	0.5 mm
Tool	ø 16 mm End mill

* Carbon steel (SM45C)

C-X Polar Interpolation (Eccentric circle)

Roundness (ø 200 mm)

0.025 mm (0.001 inch)

Cutting Condition

Speed	1600 r/min
Feed	260 mm/min
Depth	0.5 mm
Tool	ø 10 mm End mill

* Carbon steel (SM45C)

X-Y simultaneous Precision

Roundness **0.029** mm (0.0011 inch)

Squareness **0.010** mm (0.0004 inch)

Straightness **0.004** mm (0.0002 inch)

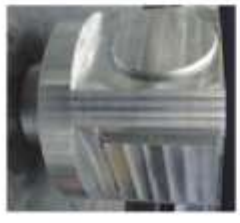
Parallelism **0.010** mm (0.0004 inch)

Cutting Condition

Speed	1600 r/min
Feed	200 mm/min
Depth	0.5 mm
Tool	ø 10 mm End mill

* Carbon steel (SM45C)

Y-Z simultaneous Precision



Roundness **0.030** mm (0.0012 inch)

Squareness **0.015** mm (0.0006 inch)

Straightness **0.005** mm (0.0002 inch)

Parallelism **0.010** mm (0.0004 inch)

Thread Milling Function

Test results

Thread Gage Check

Cutting sample **M55 x P2.0 Thread**

Cutting method **C-X Polar Coordinate**
X-Y / Y-Z
Helical Interpolation

Cutting Condition

Speed	1500 r/min
Feed	260 mm/min
Depth	30 mm
Tool	ø 20 mm Mill Thread

* Carbon steel (SM45C)

High Performance

More powerful revolving motor is adapted to improve the productivity.

End mill (Low Speed)

Material			SM45C
Cutting Tool			ø 32 (HSS)
Cutting Condition	Speed	m/min	30
	Feed	mm/min	90
Chip Removal rate		cm^3/min	105

End mill (High Speed)

Material			SM45C
Cutting Tool			ø 25 (Carbide)
Cutting Condition	Speed	m/min	220
	Feed	mm/min	1000
Chip Removal rate		cm^3/min	175

Tapping

Material			SM45C
Cutting Tool			M33 x P3.5
Cutting Condition	Speed	m/min	15
	Feed	mm/rev	3.5
Spindle Load			125 %

O.D turning

Material			SM45C
Cutting Condition	Speed	m/min	230
	Feed	mm/rev	0.6
	Dia	mm	ø 380
	Depth	mm	10
Chip Removal rate		cm^3/min	1418

Helical End Milling

Material			SM45C
Cutting Tool			ø 25 (Carbide)
Cutting Condition	Speed	m/min	240
	Feed	mm/min	800
Chip Removal rate		cm^3/min	100

U-Drill (Rotary Drilling)

Material			SM45C
Cutting Tool			ø 30 U-Drill
Cutting Condition	Speed	r/min	2000
	Feed	mm/rev	0.12
Chip Removal rate		cm^3/min	171

- The results indicated in this catalogue are provided as example.
  They may not be obtained due to differences in cutting conditions and environmental conditions during measurement.
- Turing results are obtained in the condition of standard motor.

Easy Operation Package

More powerful revolving motor is adapted to improve the productivity.

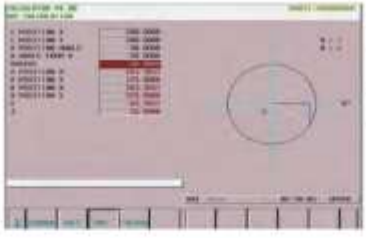
Programming

G Code List

Operator can check the meaning of each G-code.

M Code List

Operator can check the meaning of each M-code.



Calculator

Operator can calcute numerical formula in relation to arc and hole easily.

Operation / Maintenance

Tool Load Monitor opt.

The main function of this software is to detect overload when a tool is wrong, and change it to an other tool. Stop machine to protect a tool holder and next tools by detecting overload caused by tool breakage or its wear. Use editable tool life management for spare tools. Monitor load meter for all spindles and axes. If the tool load reaches abnormal band recorded in "Set data", the software issues an feed hold alarm or skips the tool.

Operation Rate - User Log In

A major determinant of efficiency is the cost associated with setting up the equipment to make a particular product. This software can be used to manage machine operation rate of 3 operators. Total machine operation and real machining time for a month can be recorded and measured. It helps to evaluate and monitor each operational efficiency. To keep it secure, Password setting is essential.

Back Up Custom Data

This can be used to record tool load information detected in "Tool load monitor" for all tools used during cutting. By reloading recorded data in tool table, Tool Load Monitor software can compare the actual tool load with a recorded load pattern.

Easy Guide i

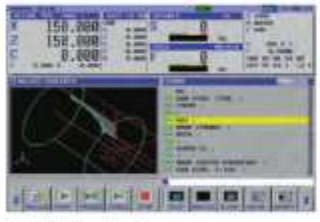
Operation Guidance, which supports entire operations on an all-in-one screen for daily machining including creating a program on the machine.

- **Uses one display screen to perform all operations including programming, checking by animation, and real machining.**
- **User-Friendly Operation :**
  Soft key selection of comprehensive cycle library
- **Easy programming**
  Based on ISO-code program format, complex machining motions can be created easily by this menu format.
- **Machine status window**
  Machine status such as actual position, feedrate and load meter are always displayed.
- **Realistic machining simulation**
  3-D solid model machining simulation is available.
- **Intuitive menu selecting**
  Menu can be selected easily and intuitively by soft-keys with icons.

Realistic machining simulation

- Realistic drawing of both turning and milling with 3-D solid models are available.
- Milling on a slanted surface can be simulated.
- Cutter mark according to a tool tip shape can be expressed.
- Tool path drawing is available

Reducing time for checking machining program



Tool Path Drawing Screen

Animated Drawing Screen

Cycle for lathe machining

- Drilling
- Bar roughing (including preformed work-piece)
- Bar finishing
- Threading (General purpose thread, metric, etc.)
- Grooving (Standard, Trapezoidal)

Cycle machining menus for both of lathe machining and milling are available

Programming time can be reduced

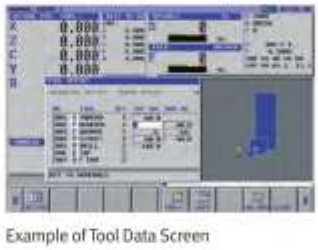
Example of Lathe Machining Cycle

Tool data management function

The tool database is constructed by adding Manual Guide i data to conventional CNC tool data.

- **Tool Offset Data**
  (Standard CNC tool data)
- **Tool Type**
  (General, Threading, Grooving, Drilling, Tapping, End Mill, etc.)
- **Tool Setting**
  (OD, ID, Right, Left, etc.)
- **Tool Shape Data**
  (Tool Nose Radius, Cutting Angle, Grooving width, Grooving length, Threading Angle, etc.)

- **Automatically referenced for animation**
- **Automatically referenced when Cycle Command is executed**



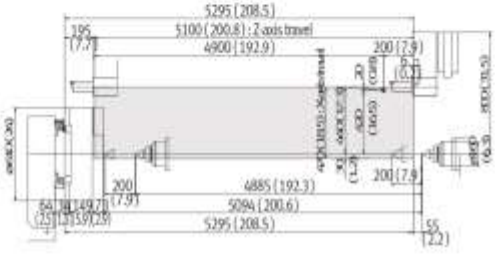
Example of Tool Data Screen

Working Range

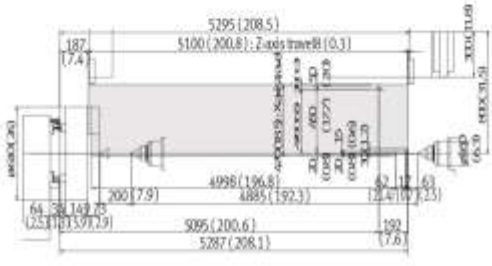
PUMA 600 / 700 / 800 XL

Unit : mm (inch)

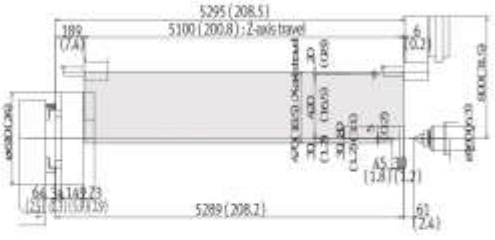
Stroke Diagram



OD Tool Holder

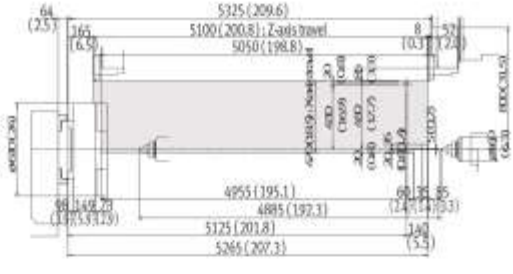


ID Tool holder



PUMA 600 / 700 / 800 XLM

OD Tool Holder



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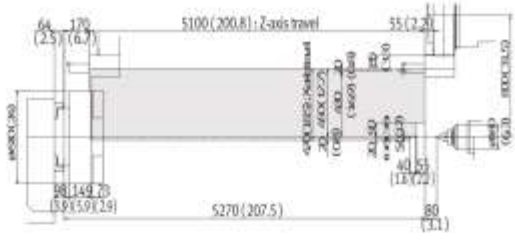
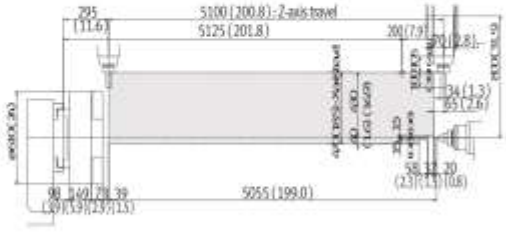
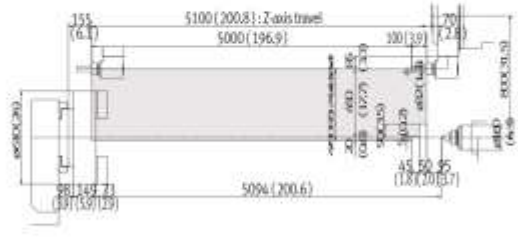


Straight milling unit



Angular milling unit

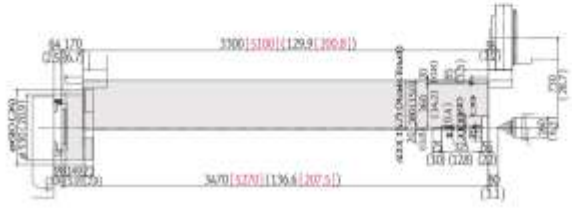


PUMA 600 / 700 / 800 LY [XLY]

Unit : mm (inch)

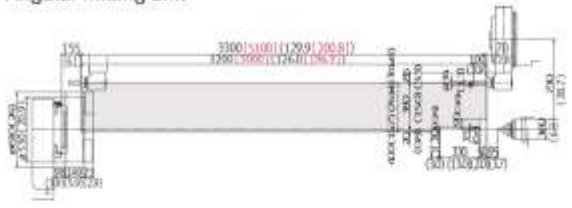
OD Tool Holder

ID Tool holder



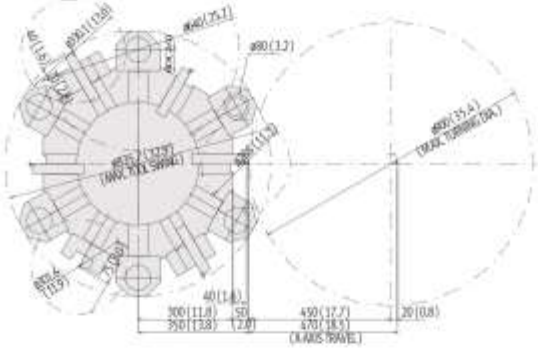
Straight milling unit

Angular milling unit

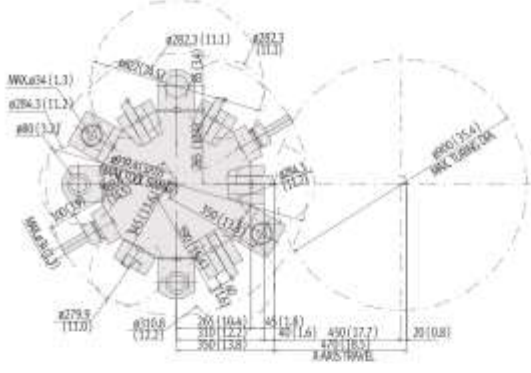


Tool Interference Diagram

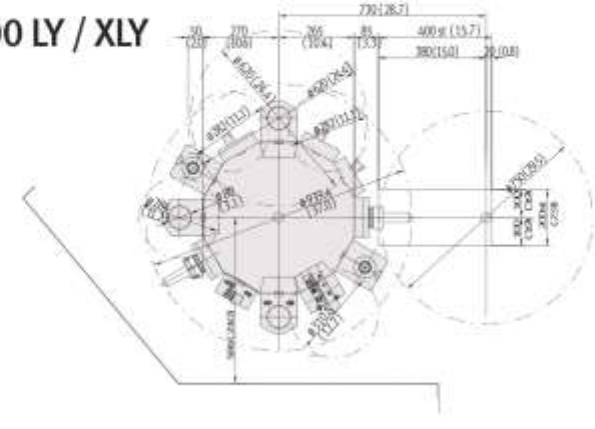
PUMA 600 / 700 / 800 XL



PUMA 600 / 700 / 800 XLM



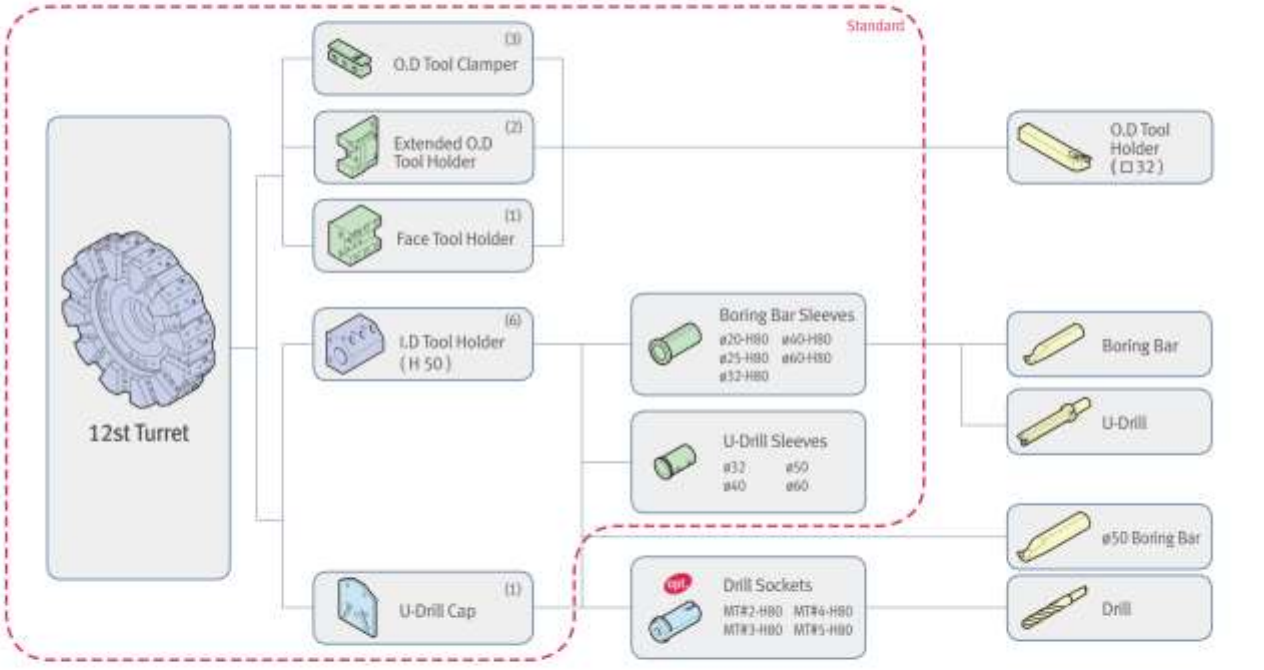
PUMA 600 / 700 / 800 LY / XLY



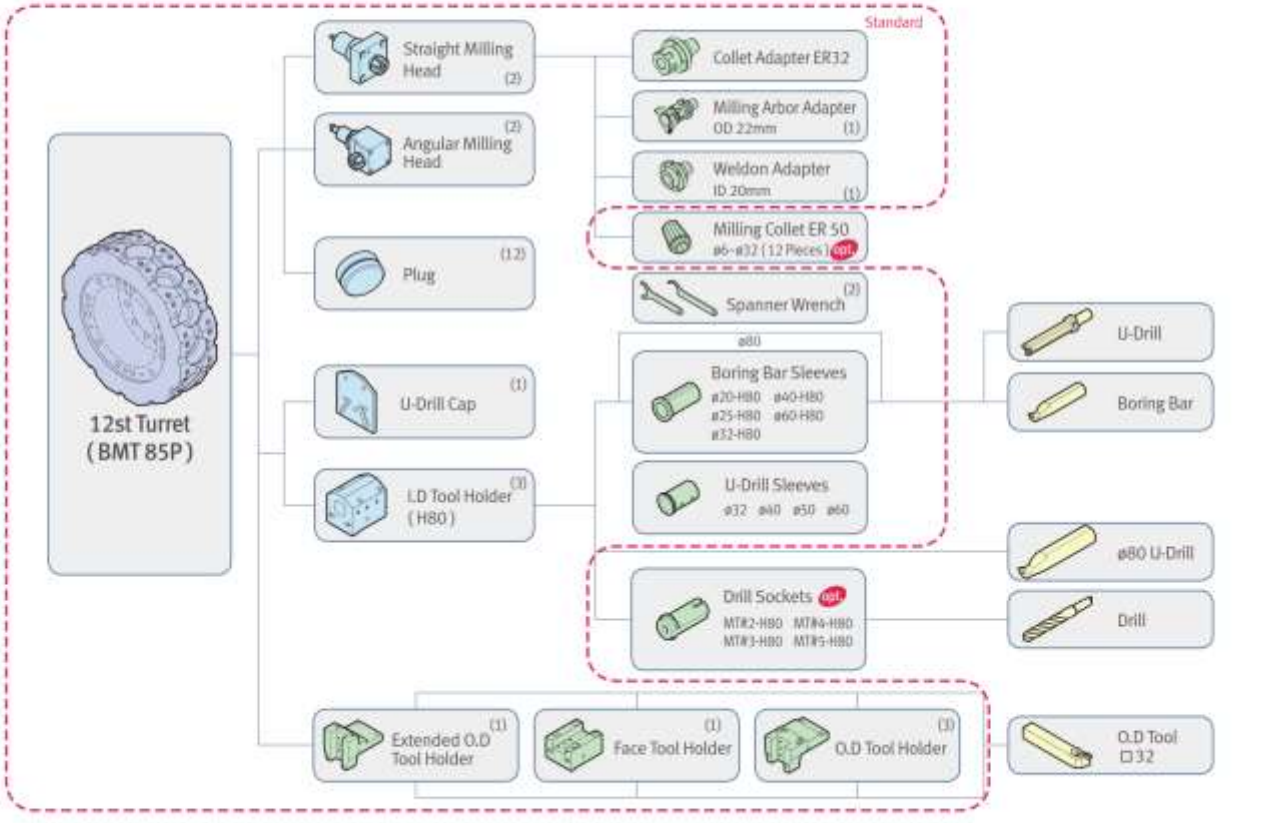
Tooling System

PUMA 600 / 700 / 800 XL

Unit : mm (inch)



PUMA 600 / 700 / 800 XLM / LY / XLY

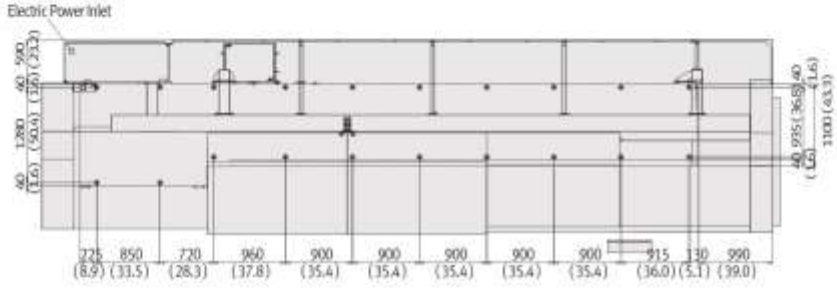


External Dimensions

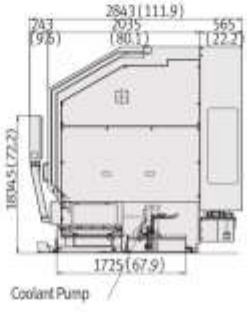
PUMA 600 / 700 / 800 XL series

Unit : mm (inch)

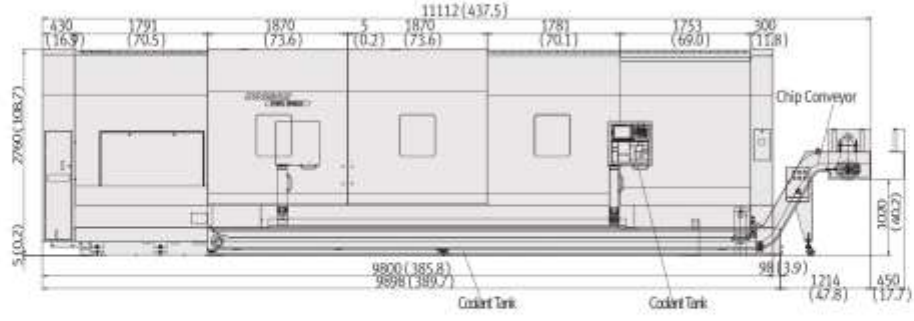
Top View



Side View

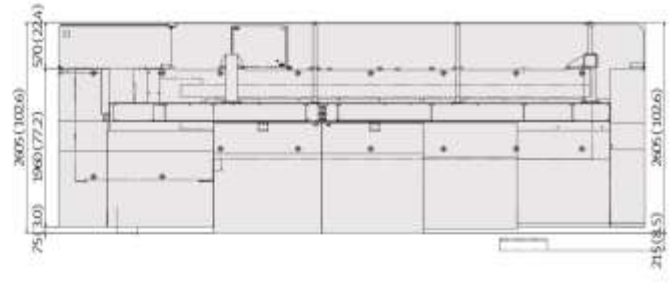


Front View

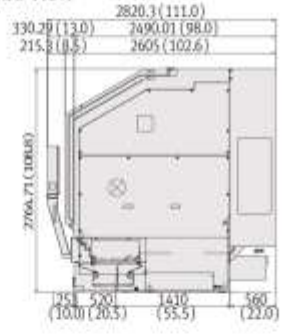


PUMA 600 / 700 / 800 LY series

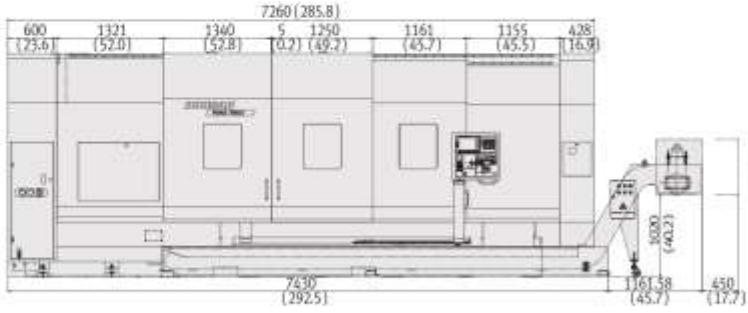
Top View



Side View



Front View



Machine Specifications

	Description		Unit	P600XL	P700XL	P800XL	P600XLM	P700XLM	P800XLM	P600LY [XLY]	P700LY [XLY]	P800LY [XLY]
Capacity	Swing over bed		mm (inch)	1140 (44.9)								
	Swing over saddle		mm (inch)	1000 (39.4)								
	Max. turning diameter		mm (inch)	900 (35.4)						750 (29.5)		
	Max. work length		mm (inch)	5050 (198.8)						3250 [5050] (128.0 [198.8])		
	Bar working diameter		mm (inch)	117 (4.6)	164 (6.5)	-	117 (4.6)	164 (6.5)	-	117 (4.6)	164 (6.5)	-
	Spindle Bore		-	152	181	320	152	181	320	152	181	320
Carriage	Travel distance	X-axis	mm (inch)	470 (18.5)						400 (15.7)		
		Z-axis	mm (inch)	5100 (200.8)						3300 [5100] (129.9 [200.8])		3250 [5100] (128.0 [200.8])
		Y-axis	mm (inch)	-						200 (7.9)		
Feedrate	Rapid traverse	X-axis	m/min (ipm)	12 (472.4)								
		Z-axis	m/min (ipm)	10 (393.7)								
		Y-axis	m/min (ipm)	-						6 (236.2)		
	Max. cutting feedrate	X / Z / Y axis	mm/rev (ipr)	500 (19.7)								
	Main spindle power (cont. / 30min)		kW (Hp)	37 / 45 (49.6 / 60.3)								
Main Spindle	Chuck size		mm (inch)	450 (17.7)	530 (20.9)	-	450 (17.7)	530 (20.9)	-	450 (17.7)	530 (20.9)	-
	Spindle speed		r/min	1800	1500	750	1800	1500	750	1800	1500	750
	Spindle nose		ASA	A2#15	A1#15	A1#20	A2#15	A1#15	A1#20	A2#15	A1#15	A1#20
	Spindle bearing diameter (Front)		mm (inch)	200 (7.9)	240 (9.4)	400 (15.7)	200 (7.9)	240 (9.4)	400	200 (7.9)	240 (9.4)	400 (15.7)
	Cs spindle index angle		deg	-			360 (0.001)					
Tool post	Turret type		-	DI Holder base			BMT85P					
	No. of tool stations		ea	12								
	O.D tool size		mm (inch)	32 x 32 (1.3 x 1.3)								
	Boring bar diameter		mm (inch)	ø 80 (3.1)								
	Indexing time (1 st swivel)		s	0.25								
	Rotary tool speed		-	3000								
	Rotary tool collets		-	-			ER 50					
Tail Stock	Quill diameter		mm (inch)	160 (6.3)								
	Quill bore taper		MT	MT#6 (Live)								
	Quill travel		mm (inch)	200 (7.9)								
Motors	Main spindle power (cont. / 30min)		kW (Hp)	37 / 45 (49.6 / 60.3)								
	Servo motor	X-axis	kW (Hp)	7 (9.4)								
		Z-axis	kW (Hp)	9 (12.1)								
		Y-axis	kW (Hp)	-						3 (4.0)		
	Rotary tool spindle motor		kW (Hp)	-			11 (14.8)					
Power Source	Electric power supply		kVA	64.44			68.6			78		
Machine Size	Height		mm (inch)	2770 (109.1)								
	Length		mm (inch)	9860 (388.2)						7430 [9860] (292.5 [388.2])		
	width		mm (inch)	3020 (118.9)								
	weight		kg (lb)	26000 (57319.3)						23000 [26000] (905.5 [57319.3])		
NC System				Fanuc 32i-A								
Chuck				Option								

- Design and specifications are subject to change without notice.
- Doosan is not responsible for difference between the information in the catalogue and the actual machine.

Standard Feature

- Coolant supply equipment
- Full enclosure chip and coolant shield
- Hydraulic power unit
- Leveling jack screw & plates
- Live center
- Lubrication equipment
- Work light

Optional Feature

- Air blast for chuck jaw cleaning
- Air gun
- Automatic power off
- Automatic measuring system (in process touch probe)
- Bar feeder interface
- Chip conveyor
- Chip bucket
- Dead center (MT #6)
- Dual chucking pressure
- Hardened & ground jaws
- Hydraulic chuck (PUMA 600 / 700)
- Hydraulic chuck & Cylinder (PUMA 800 / B)
- Hydraulic steady rest
- Manual steady rest
- Oil skimmer
- Pressure switch for chucking pressure check
- Proximity switches for chuck clamp detection
- Signal tower (yellow, red, green)
- Tool monitoring system
- Tool pre setter (hydraulic type)

- The specifications and information above-mentioned may be changed without prior notice.
- For more details, please contact Doosan

NC Unit Specifications

FANUC 32i

CONTROLS

- Controlled path	1 path
- Controlled axes	X,Z X,Z,C *1 X,Z,C,Y *2
- Angular axis control	
- Cs contouring control	
- Backlash compensation	0 – ±9999 pulses
- Chamfering on / off	
- HRV2 control	
- Inch / Metric conversion	
- Interlock	All axes / each axis
- Least input command	0.001 / 0.0001 mm/inch
- Machine lock	All axes / each axis
- Mirror image	
- Overtravel	
- Position switch	
- Stored stroke check 1	

OPERATION

- Automatic operation (memory)	
- DNC Operation with Memory card	
- Buffer register	
- Dry run	
- Handle incremental feed	X1, X10, X100
- Program restart	
- Wrong operation prevention	
- Manual intervention and return	
- Manual pulse generator	1 ea
- Manual reference position return	
- Program number search	

INTERPOLATION FUNCTIONS

- Nano interpolation	
- Positioning	G00
- 1st. Reference position return	Manual, G28
- 2nd. reference position return	G30
- Continuous threading	
- Linear interpolation	G01
- Multiple threading	
- Reference position return check	G27
- Skip	G31
- Thread cutting / Synchronous cutting	
- Thread cutting retract	
- Variable lead threading	

FEED FUNCTION

- Automatic acceleration / deceleration	
- Cutting feedrate clamp	
- Feed per revolution	
- Feedrate override (10% unit)	0 - 200 %
- Manual per revolution feed	
- Rapid traverse override	F0, 25, 100 %

AUXILIARY / SPINDLE SPEED FUNCTION

- Constant surface speed control	
- High speed M / S / T interface	
- Spindle orientation	
- M - code function	M3 digits
- Rigid tapping	
- S - code function	S4 / S5 digits
- Spindle serial output	S4 / S5 digits
- Spindle speed overridew	0 - 150 %

PROGRAM INPUT

- Absolute / incremental programming	
- Addition of custom macro common variables	#100–#199,#500–#999
- Automatic coordinate system setting	
- Canned cycle for drilling / Turning	
- Circular interpolation by R programming	
- Coordinate system setting	G50
- Coordinate system shift	
- Custom macro	
- Pocket calculator type decimal point programming	
- Diameter / radius programming (X axis)	
- Direct drawing dimension programming	
- Direct input of coordinate system shift	
- G code system A / B / C	
- Label skip	
- Macro executor	
- Manual absolute on and off	
- Maximum program dimension	±9 digit
- Multiple repetitive canned cycle	G70 - G76
- Optional block skip	9 piece
- Parity check	
- Plane selection	G17, G18, G19
- Program file name	32 characters
- Program stop / end (M00, M01 / M02, M30)	
- Programmable data input	G10
- SUB program call	10 folds nested
- Tape code : ISO / EIA auto recognition	EIA RS422 / ISO840
- Work coordinate system	G52 - G59

TOOL FUNCTION / TOOL COMPENSATION

- Automatic tool offset	
- Direct input of offset value measured	
- T - code function	T2+2 digits
- Tool geometry / wear compensation	
- Tool life management	
- Tool nose radius compensation	
- Tool offset	G43, G44, G49
- Tool offset pairs	±6 digits : 64 pairs
- Tool offset value counter input	
- Y-axis offset *2	

EDITING OPERATION

- Back ground editting	
- Number of registered programs	500 ea
- Part program editing	
- Part program storage size	640m (256 kB)

SETTING AND DISPLAY

- Actual cutting feedrate display	
- Alarm display	
- Alarm history display	
- Display of spindle speed and T code at all screens	
- Multi-language display	
- Program comment display	31 characters
- Run hours / part count display	
- Status display	
- Operating monitor screen	

DATA INPUT / OUTPUT

- External work number search	15 points
- Memory card input / output	
- RS232C interface	
- Automatic data backup	

OTHERS

- Display unit	10.4" Color TFT LCD
- MDI unit	
- PMC system	

INTERFACE FUNCTION

- Ethernet function Embedded ethernet	

OPERATION GUIDANCE FUNCTION

- EZ Guidei (Conversational Programming Solution)	

OPTIONAL SPECIFICATIONS

AXIS CONTROL

- Chuck and tail stock barrier	
- Stored pitch error compensation	(XL size bed : standard)
- Stored stroke 2 and 3	

OPERATION

- Manual handle feed	2 units
- Manual handle interruption	
- Reference position shift	

INTERPOLATION FUNCTIONS

- 3rd / 4th reference point reurn	
- Arbitrary speed threading	
- Circular threading	
- Interruption type custom macro	
- Multi step skip	

FEED FUNCTION

- AI Contour control I (Look-ahead block no. is Max30)	G5.1 Q1

PROGRAM INPUT

- Addition of workpiece coordinate system pair	48 pairs
- Automatic corner override	
- Optional block skip (Soft operator's panel)	9 piece
- Pattern data input	

TOOL FUNCTION / TOOL COMPENSATION

- Addition of tool pairs for tool life management	128 pairs
- Tool Load Monitoring system	
- Tool offset pairs	99 / 400 / 999 pairs

EDITING OPERATION

- Number of registered programs	1000 (512kB) ea
- Part program storage length	1280 / 2560 / 5120 m
- Play back	

DATA INPUT/OUTPUT

- Fast ethernet / Data server	Only for 1 path
- DNC1 control	
- Remote buffer	Only for 1 path

ROBOT INTERFACE

- Robot interface with PMC I / O module	

*1 : PUMA 600 / 700 / 800 XLM

*2 : PUMA 600 / 700 / 800 LY / XLY

DOOSAN

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Doosan Machine Tools

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